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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/824,074	04/02/2001	Stephen J. Dovey	99B156	8499

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The BOC Group, Inc.  
Intellectual Property Department  
100 Mountain Avenue  
New Providence, NJ 07974

EXAMINER
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GRAY, MICHAEL KUHN

ART UNIT	PAPER NUMBER
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3746

DATE MAILED: 05/15/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/824,074

Applicant(s)

Dovey et al.

Examiner

Michael K. Gray

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on Apr 2, 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claims \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on Apr 2, 2001 is/are a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some\* c) ☐ None of:
- ☒ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \*See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s). 4 6) ☐ Other:

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## **DETAILED ACTION**

### ***Drawings***

The drawings are objected to for the reason that the claimed "opposed ends" in claim 1 have not been provided with reference numerals which have been described in the specification. The ends, if they are to be claimed, should be demonstrated in the drawings with corresponding reference numerals.

### ***Specification***

The specification is bare bones.

Throughout the specification the terminology "pump 1" should be changed to "pump cylinder 1". This is necessary to give the claimed "cylinder" language clear and proper antecedent basis.

At page 3, line 26, the language "the pump 1 is driven" should be changed to --the piston 5 is driven--.

The specification should indicate that the "pump cylinder 1" has opposing ends with each end being given a corresponding reference numeral described in the specification and depicted in the drawing figure.

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***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

Claims 1-6 and 8 are rejected under 35 U.S.C. 102(e) as being anticipated by Yang (6,176,683).

Yang teaches a linear compressor, necessarily having a cylinder with opposed ends, wherein a piston reciprocates (col. 4, lines 42+).

Drive means 900 are connected to the piston for reciprocating movement of the piston.

Sensor means 500, 600 are in communication with the cylinder for sensing contact of the piston and either of the opposed ends and generating a contact signal representing the contact.

Control means 700 interconnect the sensor means and drive means with the control means receiving a first signal from the control means (representing contact with the cylinder) and then generating a second signal to the drive means 900 which controls movement of the piston.

The sensor means and drive means comprise a close-looped system.

The driving means 900 outputs a voltage driving signal (col 3, lines 31+).

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The sensor 500 is mounted to the exterior of the compressor cylinder 400. Figure 1.

The sensor is a piezo sensor (col. 5, line 50).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yang (6,176,683).

Yang demonstrates the invention claimed in claims 1-6. However, Yang teaches a linear compressor whereas claim 7 claims a vacuum pump.

It would have been obvious to anyone of ordinary skill in the art that the sensor and control system of Yang could have been applied to any pump or compressor system having a piston which reciprocates in a cylinder.

Claims 1-8 are further rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumura et al. (JP 11-324911) in view of Yang (6,176,683).

As for claims 1-6 and 8, Matsumura et al teach a control device for a linear compressor for preventing collision of a piston with the end wall of a cylinder.

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Control means 5, 6 are connected to a sensor 4 with the control means 5, 6 being connected to a linear motor drive 3 which drives the piston.

As a result of the examiner's consultation with the USPTO translation branch, the examiner has learned that Matsumura et al include a teaching that the sensor device therein can be "a MR sensor (magnetoresistive), a laser sensor, a differential transmission sensor or the like".

Yang teaches a piezo sensor means. In light of the purpose of Matsumura et al, i.e., to eliminate collision of a piston with the end wall of a cylinder, and in light of the fact that Matsumura et al teach that any number of sensors could be employed to achieve this purpose, it would have been obvious in light of Yang that a piezo sensor could be used in the closed system of Matsumura et al.

Accordingly, it would have been obvious that the control means and drive means of Matsumura could be utilized with a piezo sensor with the sensor imparting a signal to the control means and the control means imparting a signal to the drive means such that an appropriate current is applied to the linear motor to cause a desired reciprocation of the piston.

As for claim 7, it would have been obvious to anyone of ordinary skill in the art that the sensor and control system of Matsumura et al could have been applied to any pump or compressor system having a piston which reciprocates in a cylinder.

### ***References***

The following references are considered relevant to applicants' disclosure.

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Yang (5,947,693) discloses a linear compressor control circuit for controlling a piston's position.

Bruggen et al (4,843,951) teach a piezoelectric-sensors 17, 18 which are utilized as position end devices in a cylinder.

Olson (2,964,272) teaches a piezoelectric sensor 107 in a piston cylinder.

Tsukahara (JP 6-73879) teaches a vibration sensor 2 connected to a pump cylinder.

***Communication***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Gray whose telephone number is (703) 308-6196.

If the examiner does not answer the phone, a message will be provided as to when he will be in the Office. A message can be left by the caller on the Examiner's voice mail.

Dialing zero will give the caller further options. The examiners's supervisor Timothy Thorpe can be reached at (703) 308-0102.

The Official Fax Number is (703) 872-9302. The number for After Final Faxes is (703) 872-9303. Please indicate the application's serial number, art unit and examiner's name on the cover sheet. A call to the examiner indicating a fax is being sent will expedite the processing of the faxed material. Any inquiry of a general nature should be directed to the receptionist whose telephone number is (703) 308-0861.

/Michael K. Gray

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**Patent Examiner Art Unit 3746**

  
CHARLES G. FREAY  
PRIMARY EXAMINER